

EQUIPMENT MANAGEMENT
PREVENTATIVE MAINTENANCE PROGRAM

LOSS PREVENTION UNIT
OFFICE OF RISK MANAGEMENT
DIVISION OF ADMINISTRATION
OFFICE OF THE GOVERNOR

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EQUIPMENT MANAGEMENT

LOSS CONTROL AND MAINTENANCE PROGRAM

Introduction:

The Office of Risk Management has developed a comprehensive equipment management loss control and maintenance program to assist all State agencies in conducting effective maintenance operations within their facilities. The program will assist agencies in lowering the high cost of insurance, reducing the number of unplanned outages and extending the life of the State's boiler and machinery equipment and all other equipment owned, leased, or maintained by the agency.

Program Goal:

The primary goal of an equipment management program is to ultimately decrease the amount of unscheduled equipment maintenance by increasing the efficiency in managing the scheduled equipment maintenance. The State of Louisiana is committed to a continuing, aggressive program for maintenance of boiler and machinery equipment, and all other equipment owned and maintained by the agency, at all levels of state government. An effective program will reduce losses of equipment, decrease operational down time and extend the life of state boiler and machinery and other equipment. In order to maintain equipment in peak operating condition, the organizations production facilities demand more attention today than ever before. The size, nature and complexity of the operation will dictate specific maintenance requirements. All systems have to be maintained in such a manner that temperature, humidity, plumbing, lighting, air quality, emergency, and safety equipment are kept at an acceptable level as well as stringent building and safety codes.

Components of an Equipment Management Loss Control and Maintenance Program:

1. Agency Maintenance Policies and Procedures:

Each agency is responsible for implementing a viable equipment management maintenance program. This program shall include designating personnel who are responsible for specific maintenance areas. Policies must outline the roles and responsibilities of managers, supervisors and employees within the maintenance program. These policies should be made available and accessible to all maintenance personnel. The Loss Prevention Unit will provide guidance and direction to agencies in developing an effective equipment management loss control and maintenance program.

2. Communication/Organization:

The Loss Prevention Unit will work with agencies in setting up the program within the agency. The Unit will also assist agencies in identifying systems and objects to be incorporated into the program. The commercial insurance carrier will make observations of the maintenance program during their inspections at State facilities. These observations, along with recommendations for corrective action, will be reported in writing to the Office of Risk Management. All correspondence will then be forwarded to the agency for compliance with recommendations.

Agencies who have commercial maintenance/service contracts in force will notify their State Loss Prevention Officer during their periodic visit.

3. Audits and Record Keeping:

The Loss Prevention Unit will assist agencies in reviewing and analyzing their equipment management maintenance program to determine that it is properly designed to have the intended impact. Records will be maintained on all equipment to include, but not necessarily limited to, preventive maintenance schedules, testing results, repair documents, replacement

documents and all completed service documents. Annual audits will be conducted on the program.

Responsibility:

The Loss Prevention Unit will assist agencies in organizing and implementing a maintenance program that minimizes the adverse impact of boiler/machinery and other equipment failures.

Department and Agency Heads are responsible for the implementation of an equipment management maintenance program for their particular type of equipment. This program will include as a minimum responsibility:

Equipment Inventory

- What items have to be maintained?
- Where are they located?
- What has to be done to them?
- What trade skills are necessary to accomplish this work?
- How often should it be done?
- How long should it take?

Equipment History

- What work was done on this equipment in past?
- Who did it?
- How long did it take?
- What parts were used?
- How often has this problem occurred in the past?
- Is it cost effective to replace this equipment?
- Should this work be billed to a tenant?

Staffing

- What manpower is required?
- What level of skill is required?
- Is the manpower being used effectively?
- Does anyone require training?

- Can the work be done in-house or contracted out?

The Commercial Insurance Carrier will perform on site inspections to insure agencies are operating within the prescribed boiler/machinery code and law. They will forward a copy of this report to the Office of Risk Management.

A Commercial Elevator Inspector will conduct annual elevator inspections at all agencies. Maintenance deficiencies, recommendation and code violations for the elevator contractor and the building owner/manager will be issued. A copy of the report will be sent to State Buildings and Grounds and to the Loss Prevention Unit. The agency is responsible for the repair or replacement of all deficiencies and code violations immediately.

For additional information:

For additional information, call the Loss Prevention Unit at (225) 342-8532.

Documentation of Equipment:

Individual maintenance schedule records for boiler and pressure vessels, motors and engines, gear sets, electrical equipment and transformers are provided in this program. These schedules should be tracked on a computer based program or minimally retain the records on index cards or other written medium. Agencies may use their own forms but must include, as a minimum, the information on the Addenda.

All rotating machines need to be on a formal lubrication program with specific individuals assigned to the task of doing the lubricating. He should document how often he does it, what type of lubrication is needed, how much quantity is required in the equipment itself, and keep an inventory record of the different lubricants he needs.

Monitoring Systems: These should be included for a complete preventive maintenance program.

1. Vibration - This should be installed on all critical rotating machines.

2. Infrared - This should be used to find hot spots in electrical equipment such as transformers, switch gears, and cables.
3. Megger testing (insulation resistance) - This should be used to detect grounds, damp windings, damaged insulation, current leakage to ground and other conditions that contribute to electrical breakdown.
4. Transformer oil testing - This should be used to detect dissolved gases in the transformer oil (annually).

It is recommended that on special equipment the agency follow suggested manufacturer's preventive maintenance.

EQUIPMENT INCLUDED IN THE PROGRAM

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Water heaters:

A. Monthly

1. Check pressure temperature relief valve for proper spring action and disk seating.
2. Check for leaks at all seams on the outer casing, around the bottom, and all plumbing connections.
3. Check the operation of the safety valve(s) by manually opening it.
4. Flush low-water fuel cut-off.

B. Annually

1. Inspect the burner and burner controls for proper flame setting (gas fuel).
2. Flush the vessel and check for evidence of mineral deposits.
3. Check the resistance of the heating elements on electric water heaters. An infinite resistance indicates that the element is burned out and needs to be replaced.

Boilers (small heating and supply types)

A. Daily

1. Check the gauges and record the readings
2. Check the water level and gauge glass
3. Check operational water level
4. Clean the boiler room when necessary

B. Weekly

1. Check the control linkages for the burner
2. Manually trip the low water cut-off and check its operation
3. Check the air damper
4. Check the valves on the gas train for proper operation and check for leaks
5. Check the pilot light

C. Monthly

1. Check flame detector
2. Blow down boiler (If chemically treated, this should be done only if sludge is present)

D. Yearly

1. Disassemble the low water cut-off and check its operation and general condition
2. Inspect the water side of the boiler and clean if necessary. (Hot water supply boilers annually, hot water heating boilers biannually)
3. Check the burner setting and adjust if necessary
4. Inspect the fire side and repair if necessary
5. Check the resistance of the elements if the boiler is electric

Boilers

A. General

1. Provide a thorough water-side and fire-side inspection at least annually.
2. Inspection frequencies are most generally established by the legal jurisdiction.
3. Unattended boilers should have two low-water fuel cutoffs. One should be of the manual reset type and should be the lower unit.
4. A daily log as well as records of all inspections, maintenance, and testing should be maintained.
5. Follow manufacturer's instructions for start-up and operation.
6. If water level is noted below safe level on steam boilers, shut-down immediately and cool slowly. Apply a hydrostatic test and inspect for leaks and over- heating.
7. Following the operation of a safety device, always determine the cause and correct the deficiency before resuming operation.
8. On steam boilers, blow down water-wall heaters and economizers in accordance with manufacturer instructions.
9. Keep blow-down valve in good repair and free of leaks.
10. Water treatment should be controlled to retard corrosion and/or scale formation. A reputable water treatment specialist should conduct this.
11. ASME certified welders should do all boiler repairs, which may affect the integrity of the pressure parts.
12. Perform a slow-drain test on low-water fuel cutoff on water boilers whenever boiler is drained.

B. Daily

1. Continually monitor water level.
 - a. Check water gauge glass for proper water level on steam heating boilers.
 - b. Check pressure on altitude gauge on hot water heating boilers.
 - c. Blow down water-gauge glass each shift on steam boilers.
2. Observe combustion conditions and check for leaks.
3. Make sure all drain valves and cocks are tightly closed after daily tests.
4. Steam heating boilers:
 - a. Operate each gauge cock.
 - b. Open "blow off" valve for a few seconds to drain off sediment.
5. Hot water boilers:
 - a. Check expansion tank glass to ascertain proper air cushion.
 - b. Check water temperature. It should never exceed 250 degrees Fahrenheit (120 degrees Centigrade).
6. On high-pressure steam boilers, test feed-water regulators, low-water fuel cut-off by a quick drain test and alarms.
7. Check boiler for water leaks. Leaks should be repaired.

C. Weekly

1. Blow down float (or electrode) chambers of each low-water fuel cut-off, low water alarm, and feed water regulator to keep chambers free of sediment and to keep them operable. Testing of low water fuel cutoffs should be done with the burner in operation; if the burner fails to shut off, service immediately.
2. On low pressure steam boilers, test low-water fuel cutoffs by a quick drain test.
3. Flush low-water fuel cut-off on hot water boilers.

D. Monthly

Perform prescribed inspections and tests of combustion safeguards at intervals recommended by manufacturers, or at least once a month for gas or oil fired equipment. Include tests for tightness of safety shut-off valves, response to flame failure and proper action of fuel air interlocks.

E. Quarterly

Test each low-water fuel cut-off on high-pressure and low-pressure steam boilers in an actual test by slowly lowering the boiler water level until the burners shut off. When making this test, water level should never be permitted to fall out of sight in the gauge glass.

F. Annually

At least the low-water cut-off should be dismantled, inspected and cleaned as necessary to determine proper operation.

G. End of Heating Season

1. Steam boilers

- a. Drain boiler and remove closure plate and/or plugs from all access openings.
- b. Remove all fuses from burner circuits.
- c. Remove all soot and ash from furnace, tubes, and flue surfaces.
- d. Flush boilers thoroughly to remove all sludge and loose scale particles from internal surfaces.
- e. Repair or replace leaking tubes, nipples, stay bolts, packing and insulation.
- f. Clean and overhaul automatic controls.
- g. Check the condensate return system for tightness and integrity of components.
- h. Leave steel boilers open and dry.
- i. Attach a conspicuous sign warning that boiler is empty and not to be fired.
- j. If wet, lay-up is preferred, boiler should be completely filled with properly treated water to prevent corrosive action. A boiler-water treatment specialist should be consulted.
- k. After draining and flushing cast iron boilers, refill with clean water to normal operating level.

2. Hot Water Boilers

Drain from bottom while boiler is hot until the water runs clear, then refill. If water treatment is used, sufficient treatment compound should be added to condition replacement water.

H. Beginning of Heating Season

After firing, test all automatic controls including feed water regulator, low water fuel cut-off, alarm, and combustion safeguards. Also "pop test" safety valves to assure they will work under boiler pressure within allowable tolerances. At all times maintain a permanent boiler log book to record maintenance work, inspections, tests, and other pertinent data.

Coil-Type Water Tube Boilers

Annual

1. Excess temperature controls and low-water cut-off should be provided and properly maintained (see Boilers for testing and maintenance).

Pressure Relief Valves

A. General

The testing interval should not exceed what is necessary to keep the safety valves in satisfactory condition, based on operating experience. Any safety valve testing requirements established by regulatory bodies, including government agencies, must take precedence over other conditions.

B. Testing

Per manufacturer, NBIC, and/or jurisdiction specifications.

Pressure Vessels

A. General

1. Pressure vessels are generally designed and fabricated for a specific service and should be so used, following the manufacturer's suggested operating and maintenance procedures. Pressure, temperature, corrosion and cracking should be strictly controlled and monitored.
2. This section includes air receivers, heat exchangers, etc.
3. Repair and clean as needed, based on previous records and inspection.
4. Periodic thickness checks should be conducted, where there is a possibility of corrosion or erosion.

B. Weekly

1. Observe physical condition.
2. Where applicable, drain condensate.
3. Where applicable, inspect and record operating valves and controls.

C. Monthly

Test safety devices.

D. Annually

Test and calibrate all controls.

E. Every Two Years

Conduct an internal examination. Pressure vessels containing

corrosive materials or involving erosion problems should be examined more frequently. NBIC gives good lists of inspections items.

Air Conditioning Units (window units/heat pumps)

A. 3 month (window units)

Clean the evaporator air filter or replace if it is disposable type.

B. Annually (window units)

1. Lubricate the fan motor
2. Clean the evaporator and condenser coils (more often for severe conditions)
3. Clean the condensate drain
4. Check for leaks throughout the system
5. Check the electrical connections for looseness and tighten if necessary.
6. Winterize the system if necessary.
7. Check the freon charge before summer use

C. 3 months (heat pumps)

Clean the evaporator air filter

D. Annually (heat pumps)

1. Lubricate the fan motor
2. Clear the evaporator and condenser coils (more often for severe conditions)
3. Inspect for leaks throughout the system
4. Test the defrost cycle
5. Clean the condensate drain
6. Check the electrical connections for looseness and tighten if necessary
7. Check the fan belts, adjust or replace as necessary
8. Check the freon charge in the system

Large Air conditioning units

A. Weekly

Check the oil level if applicable

B. 3 Month

Same as for heat pumps

C. Annually

Same as for heat pumps

Air Conditioning Systems

A. During Winter Shut-down

1. Carefully inspect compressor bearings. Measure the seal gap in thrust bearings when unit is new and remeasure each year to check for excessive wear. Excessive wear (greater than 0.005 inches per year) should be promptly investigated.
2. Check the oil carefully and renew before spring start-up. Drain oil from the seal oil reservoir, atmospheric float chamber and main oil pump and replace it with new oil after service operations have been completed.
3. Make a thorough inspection for leaks and repair if necessary. The most likely places are around the cooler ruptured disc or relief valve, the cooler condenser expansion joint, suction, damper seal, low refrigerant cut-out bulb in the cooler, and valves, flare and gauge connections in the purge.
4. Inspect the purge thoroughly for tightness of all connections. Make a leak test and an operational test.
5. Inspect electric dryers. Check starter contacts for burning and replace if necessary. Check for loose connections and starter operation.
6. Clean motors of foreign material. On variable speed motors, inspect the drum controller for smooth operation. Check the resistance element for loose connections.
7. Check shaft journal bearings and thrust bearings for wear and proper clearance. Examine starter motor winding insulation.
8. Check operation and setting of all safety controls. This includes condenser high pressure cut-out, low refrigerant temperatures cut-out, and low oil pressure switch. Inspect operating controls such as the chilled water controller. Inspect and clean all thermostats, hydrostats and relays.

Check for proper calibration. Examine sequence of operation of control instruments and operators such as damper motors and chilled-water valves.

B. On a Regular Basis as Necessary

1. Clean or replace filters.
2. Perform shut-down and start-up inspections on condensers and cooling towers and check frequently for excess noise or vibration.
3. Obtain specific water-treatment advice from a water-treatment specialist since the major part of preventive maintenance on cooling towers and evaporative condensers is a good water-treatment program.

Air conditioning systems (chilled water type)

A. Daily

1. Log equipment readings
2. Check oil and freon levels in the bullseyes
3. Check to see if the controls are operating properly

B. Annually

1. Pressure test the machine
2. Tighten flange nuts and belts
3. Check baffles and gaskets

Compressors

A. Daily

1. Listen for unusual noises and vibrations
2. Check and record suction and discharge pressures
3. Check the oil level and look for oil leaks
4. Check the bearing temperature
5. Check for crank case sweating (reciprocating type)

B. Monthly

1. Check for freon leaks with a halide torch
2. Check high-low pressure cut-off setting

C. Annually

1. Check couple alignment
2. Check unloading devices for proper operation
3. Clean strainers and oil filters
4. Check and test relief valves

D. 5 Years

Perform an Eddy Current Test on the condenser and evaporator

Motors

A. Daily

1. Check the motor and bearing temperature
2. Listen for noises or vibrations

B. Monthly

1. Oil or grease the bearings
2. Check the brushes for arcing
3. Check all electrical connections for looseness and tighten if necessary
4. Check the couple for alignment and tightness

C. Annually

1. Clean the frame and air passages
2. Check voltage and amperage
3. Check vibration isolators and anchor bolts
4. Check to see if the motor comes up to speed promptly

Condensers

A. Daily

1. Check cooling water for corrosive elements

2. Check and record water temperature and pressure
3. Check and record refrigerant temperature

B. Monthly

1. Check for freon leaks with a halide torch
2. Check for cooling water leaks

C. Annually

1. Drain out all the water and clean if necessary
2. Check the tubes for corrosion or erosion and inspect the tube for clogging
3. Replace any damaged tubes
4. Replace gaskets
5. Check all the valves and repair if necessary

Evaporators

A. Daily

1. Check and record inlet and outlet chilled water temperatures
2. Check and record refrigerant temperatures

B. Monthly

1. Check for refrigerant leaks
2. Check for chilled water leaks

C. Annually

1. Drain out all the water and clean if necessary
2. Check the tubes for corrosion or erosion and inspect the tube for clogging
3. Replace any damaged tubes
4. Replace all gaskets

Cooling Towers

A. Daily

1. Check the water for corrosive elements
2. Check the operation of spray nozzles
3. Check the float for proper operation

B. Monthly

1. Oil or grease bearing in the fan motor
2. Check for algae growth in the pan
3. Do a chemical analysis on the water
4. Check the fan bearing oil and temperature

5. Check the fan rotation for imbalance
6. Check the tension on the fan belt

C. Annually

1. Drain and clean pan and inspect for rusting
2. Repair or replace float valve if necessary
3. Clean the spray nozzles
4. Check fan drive and check bearing for water
5. Check all valves and repair if necessary

Piping

A. Monthly

Check for leaks and repair if necessary

B. Annually

1. Check all the valves and repair if necessary
2. Check the piping for signs of rust and corrosion and repair or replace as necessary
3. Clean the strainers (cooling water)
4. Check for signs of sweating on insulation and repair (chilled water)

Purge System

A. Weekly

Check the sight glass evidence of water floating on the refrigerant and drain when necessary

B. 3 Months

1. Check the belt tension
2. Oil the purge compressor if necessary use of over 1/2 pint indicates problems

Absorption machine

A. Daily

1. Inspect for corrosion and leaks
2. Check sight glasses

B. Monthly

1. Test for hydrogen
2. Check control wells. Clean and renew oil
3. Grease and operate all valves
4. Determine absorber loss
5. Take lithium bromide samples
6. Test the unit for non-condensable accumulation rate

7. Clear motor cooling line strainer(s)

Electric Panels

Periodic visual inspection for discolorization of wiring, loose connections and cleanliness.

Switchgear

A. General

1. Annual maintenance inspections are minimal.
2. Environmental or operational conditions may warrant more frequent inspections.
3. Infrared scanning is recommended to detect hot spots, loose connections, overloaded circuits, etc. on a biannual basis.
4. After each fault interruption, check unit and replace damaged parts.

B. Daily

1. Listen for unusual noises.
2. Check for overheating.

C. Weekly

Examine indoor enclosures for signs of moisture or water.

D. Annually

1. Keep interior clean and free of any dust or accumulation of foreign materials.
2. Check interior surfaces for moisture.
3. Check ventilation.
4. Check all insulating members for evidence of cracking.
5. Check high voltage switchgear for corona (white or gray powdery residue).
6. Check for thermal damage caused by exposure to excessive temperatures.
7. Check and tighten loose connections.
8. Examine the contacts for burning or pitting.
9. Exercise the breaker mechanism.
10. Test protective relays to trip breakers.

Motor Control Equipment

A. General

The proper cleaning frequency depends upon the operation and surrounding conditions.

B. Monthly

1. Clean and tighten all connections and lubricate bearings.
2. Check level and condition of oil (if used-could be dry).
3. Keep covers closed and latched and enclosures tight.

C. Annually

1. Inspect copper arching tip and renew when proper contour cannot be maintained.
2. Remove deposits from arc chutes and barriers.
3. Remove and replace barriers before they are burned through.
4. Check contact pressure and alignment.
5. Check controls for undesirable grounds.
6. Replace frayed or worn shunts.
7. Check bus-bar support insulators and keep clean.

Oil Circuit Breakers

Annually

1. Perform complete inspection and overhaul. Check for leaks and proper oil level prior to dismantle.
2. Test oil.
3. Thoroughly clean all parts inside and out. Lubricate those parts requiring it. Give particular attention to operating and tripping mechanisms and bushings.

4. Check contact alignment and adjustment.
5. Dress slightly rough places on contacts with sandpaper or a fine file.
6. See that lift rods are not warped or cracked.
7. See that latches and triggers are properly adjusted and not badly worn or corroded.
8. Inspect flexible shunts, if any.
9. Examine main current paths for evidencing of overheating.
10. Check pins, bolts, nuts, and general hardware. Tighten and replace if necessary.
11. See that auxiliary switches are tightly mounted and contacts are in good condition.
12. Check control wiring for loose connections.
13. Check settings for auto tripping units and test their operation.
14. Check reliability and adequacy of circuit breaker and tripping current source.
15. Lubricate bearings, gears, etc.

Air Circuit Breakers

Annually

1. Clean the arc quenching or deionizing mechanisms.

2. See that arc chambers are properly aligned and securely fastened.
3. Perform complete inspection and overhaul.
4. Thoroughly clean all parts inside and out. Lubricate those parts requiring it. Give particular attention to operating and tripping mechanisms and bushings.
5. Check contact alignment and adjustment.
6. Dress slightly rough places on contacts with sandpaper or a fine file.
7. See that lift rods are not warped or cracked.
8. See that latches and triggers are properly adjusted and not badly worn or corroded.
9. Inspect flexible shunts, if any.
10. Examine main current paths for evidence of overheating.
11. Check pins, bolts, nuts, and general hardware. Tighten and replace if necessary.
12. See that auxiliary switches are tightly mounted and contacts are in good condition.
13. Check control wiring for loose connections.
14. Check settings for auto tripping units, and test their operation.
15. Check reliability and adequacy of circuit breaker, tripping current source.
16. Lubricate bearings, gears, etc.

Transformers

A. General

1. A D.C. high potential test should be scheduled whenever internal trouble is suspected.
2. If a transformer has handled severe overloads or there is indication of internal trouble, it should be inspected as soon as possible.
3. The need for spares depends on importance of the process or production served, repair time and replacement lead time.

B. Daily

Listen for unusual noises.

C. Weekly

None

D. Monthly

1. Check liquid level on liquid-immersed units.
2. Check ambient temperature.
3. Check inlet and discharge cooling-water temperature for water-cooled units.
4. Check temperature of ingoing and outgoing cooling air for

dry-type.

5. Check temperature of oil entering and leaving the heat exchanger for a forced oil-cooled unit.
6. Check pressure-vacuum gauge on sealed type units.
7. Check any pumps and fans for proper operation.
8. Investigate the cause of unusual noise.
9. Check the ampere load on important transformers if changes have been made in power consumption.
10. Clean dirt and dust from exterior.
11. Check breather for any restrictions.
12. Check protective alarms such as temperature indicators.
13. If located outdoors, check surrounding area for vegetation, foreign objects stored there, or wildlife that post a threat of grounding or shorting the phase conductors.

E. Annually

1. Complete an external inspection on liquid-immersed and gas-cooled dry-type units:
 - a. external damage
 - b. deterioration
 - c. leakage
 - d. accumulation of foreign deposits
 - e. corrosion
 - f. clean and test bushings
 - g. check ground connections
2. Check tap changers and load ratio control apparatus when

provided.

3. Analyze water for scale, corrosive properties, etc. for water-cooled units.
4. Service any pumps and fans by cleaning and overhauling.
5. Check ground connection resistance. Resistance of ground should be five ohms or less.
6. Check and clean lighting arrestors.
7. Clean, test and recalibrate relays.
8. Fuses
 - a. Clean all insulators and inspect for damage.
 - b. Replace badly pitted or burned contacts. Check pressure and alignment.
 - c. Check expulsion fuses for mufflers to restrict gas discharge.
 - d. Check latch to be sure fuse assembly is firmly locked in when closed.
 - e. Check size of fuses and adequacy of interruption capacity.
9. Test insulation liquid for acid, moisture, color, gas and dielectric strength.
10. Insulation Test
 - a. Insulation Resistance
 - b. Dielectric absorption

AC Generators

A. General

1. Peaking units may require more frequent inspections than base-load machines.
2. Qualified personnel or a manufacturer's representative should conduct internal examinations.

B. Daily

Visually inspect collector rings for sparking, dust accumulations, or vibration.

C. Weekly

1. Blow off excessive dust from collector ring insulation and brush rigging.
2. Check collector ring for smoothness of operation.
3. Inspect the lube oil system for possible leaks, excessive vibration and temperature.

D. Every Three Years (Totally Enclosed Recirculating)

1. Clean the stator and field windings. Revarnish stator coils where required.
2. Check stator and field windings for looseness in slots, tightness of slot edges. Inspect condition and tightness of blocks and spacers and twine lashings. Check for tape separation and evidence of damage to the insulation due to corona discharge.
3. Examine rotor-retaining rings and slot wedges for signs of movement, overheating and cracking.

4. Check the bearings.
5. Check collector rings.
6. Check vibration of machine before and after each overhaul.
7. Service the exciter.
8. Test the insulation resistance of the rotor and stator windings.
9. Following a satisfactory insulation-resistance test, make a dielectric absorption, overpotential or insulation power factor test.
10. Carefully inspect the oil lines, steam lines, valves, fittings, and other hot surfaces of the turbine.
11. Inspect all oil lines for the generator and eliminate all leaks and vibration. Inspect connections for gauges and similar accessories.

E. Unscheduled Shutdown (All Types)

Recommendations 1 to 8 below should be performed at each major shutdown. If a dismantle inspection has not been made within twenty-four months, follow all recommendations.

1. Clean collector insulation thoroughly.
2. Check insulation resistance of the collector ring and the rotor winding.
3. Determine if collector rings are cylindrical and running true.
4. Inspect air filters and clean or replace.

5. Check gas or air coolers for effectiveness. Keep outer heat-transfer surfaces of cooler tubes clean, and check drains for signs of leaks.
6. Check hydrogen-cooled machines for leakage by observing the ability of the system to maintain the gas pressure or by the gas purity indicator.
7. Remove end shields and check stator winding for oily deposits and corona. Clean winding if necessary and inspect insulation and connections. Check bracing and cording for looseness.
8. Check gas passages and remove any obstructions.
9. In liquid conductor-cooled machines, check all connections, hose, and piping for leaks.
10. Inspect armature core, finger plate, and structural parts for hot spots.
11. Examine rotor for movement or distortion of field coils, blocking of end turns, dirt in ventilating ducts, loose wedges, and local hot spots on rotor surfaces between the retaining ring wedges and rotor body.
12. Examine stator lead bushings for cracks, loose parts and oil leakage; clean thoroughly.
13. Inspect fan blades for cracking.
14. Test retaining ring for cracks by means of ultrasonic detection, liquid penetrant, or by the magnetic particle method.
15. At each major overhaul, dismantle the hydrogen seals and clean seal oil grooves and holes. Check the wearing surfaces of the seal ring and shaft for alignment and wear. The seal oil and vacuum pumps should be dismantled and

carefully inspected at this time.

16. Check the bearing assembly for tightness and correct alignment.
17. Test all gas-control equipment and the alarm system.
18. Remove all loose dust with a vacuum cleaner. Remaining oil or dirt should be removed by wiping exposed surfaces with clean cloths.
19. Inspect windings for evidence of deterioration.

DC Generators (Rotary Converters)

A. Weekly

Inspect bearings, and commutators.

B. Annually

Check insulation resistance.

C. Every Two Years

1. Check bearings and air gaps on sleeve-bearing units.
2. Recondition commutator, and slip rings.
3. Clean windings and reinsulate or revarnish if conditions require.
4. Examine rotor-band wires for corrosion or looseness.
5. Check rotor coils, washers, and coil braces for looseness or mechanical defects.

Electric Motors

A. Semi-Annually

1. Open-frame motors in dusty or linty locations should be cleaned with vacuum equipment unless designed for cleaning with low pressure compressed air. Air should be clean, dry and less than 30 psi.
2. Check oil level of sleeve bearings and condition of oil rings.
3. Check the bearing temperature.
4. Inspect motor surrounds for water, oil, steam, dirt, dust and any loose objects.
5. Observe motor for vibration and noise.
6. Motors with commutators or slip rings should be checked for excessive sparking. Also check commutator for high or loose bars or roughness. Collector rings should be clean and smooth with no scoring or pitting.
7. Inspect flexible shunts, if any.
8. Examine main current paths for evidence of overheating.
9. Drain, wash out and renew oil in sleeve bearings.
10. Check grease in ball and roller bearings. Bearings sealed for life require no additional lubrication.
11. Check motor amperes.
12. Check motor hold-down bolts, end-shield bolts, pulleys, couplings, gears, journal keys, set screws and alignment.

B. Annually

The following pertains to open-type motors larger than 500 hp.

1. Dismantle, clean and overhaul unless operating in a very clean environment.
2. Clean foreign accumulations or windings and air passages.
3. Check all electrical connections for tightness.
4. Check the condition of coil insulation and examine all windings.
5. Check bearing wear and rotor clearances.
6. Clean out and renew grease in all ball and roller bearing housings.
7. If varnish has deteriorated, windings should be revarnished in accordance with manufacturer's recommendations.

C. Every Three Years

Totally enclosed motors over 500 hp should be dismantled, cleaned and overhauled as recommended (Items 1 through 8) for open motors.

Storage Batteries

A. General

1. Adequate ventilation should be provided for all battery storage areas to prevent hydrogen accumulation.

2. Inspect battery terminals to make sure that they are clean, tight, and free of corrosion.
3. Remove any dust or dirt accumulations on top of cells and keep them clean and dry.
4. Check level of electrolyte.
5. Batteries in a common bank should be maintained at the same temperature. Therefore, windows in a battery room are not recommended (one reason).
6. Batteries should be supported on racks so they are not in direct contact with the ground.

B. Monthly

Check and record specific gravity and voltage of the pilot cell on each battery or group of cells.

C. Quarterly

Give the battery an equalizing charge to ensure that it is fully charged.

D. Semi-Annually

1. Check specific gravity and voltage of each individual cell. Uneven cell voltages and specific gravity indicate trouble or approaching failure.
2. Check ventilation in the area where the battery is located.

Relays

A. Daily

Observe indicating targets.

B. Semi-Annually

Inspect relays and condition of contacts.

C. Annually

1. Check contacts and replace if necessary.
2. Check calibration and operate to determine if relays will function as needed under fault conditions by setting up artificial conditions under simulated loads.
3. Check floor for matchbooks, folded paper, etc. used to prevent relay contacts from making contact (over-riding relay) which are removed just prior to your examination.

Lightning and Surge Protective Equipment

Annually

1. Inspect and clean all exposed insulation surfaces on lightning arrestors and capacitors. Occasionally, an enthusiastic maintenance person will put a coat of paint on arrestors or bushings. Beware!
2. Check line and ground leads for damage. Clean and tighten connections.
3. Test resistance of the ground connection. Resistance should be

five ohms or less.

Rectifiers (Power Semi-conductor Equipment)

General

1. Check for excess temperature build-up by installing thermocouple to the base or heat sink.
2. For forced cooling type units make sure that the cooling medium is operating properly.
3. Clean any dirt accumulation with a solvent that is safe to use on that piece of equipment.
4. Check for looseness of connections and mounting and tighten if necessary.

Uninterruptable Power Supplies

General

1. Be sure all input and output power has disconnected when work is to be done.
2. Discharge and ground all capacitor terminals in charger and inverter with a grounding stick.
3. Use a vacuum cleaner, and a cloth if necessary, to clean inside of charger and inverter cabinets.
4. Check for liquid contamination (battery electrolyte, oil from capacitors, etc.).
5. Tighten all terminals.

6. Inspect all terminations and control circuits for corrosion.
7. Check battery condition.
8. Correct source power and check control circuit power supply voltages per manufacturer's specifications.
9. Check and adjust voltage output and frequency per manufacturer's specifications.
10. After reconnection check the output voltage and frequency under load.
11. Simulate a power failure and check for proper system operation.

Steam Turbines

A. General

1. A complete warranty dismantle inspection by the manufacturer within the first year of operation.
2. A complete dismantle inspection should be made as follows:
 - a. Every 25,000 operating hours or five years for units operating less than 8,000 hours per year and more than eight starts per year.
 - b. Every 40,000 operating hours for units operating at least 8,000 hours per year and less than eight starts per year.
 - c. Every 12,000 operating hours or three years for all other units.

3. The frequency of any tests should be increased if operating experience indicates more frequent tests are required.
4. Records should be kept and include operating hours, all repairs, tests, and other important data.
5. Manufacturer's suggested operating procedures should be followed for oil systems, temperatures, vibration, etc.

B. Weekly

Test units equipped with throttle valve stem, reheat stop valve and interceptor valve stem exerciser.

C. Monthly

Check:

1. Overspeed trip.
2. Low bearing oil pressure trip.
3. Low vacuum trip.
4. Thrust bearing oil trip.
5. Test lubricating oil for contamination.

D. Semi-Annually

1. Test overspeed trip mechanism by overspeeding. If continuous operation, test annually, or when coming online with unit.
2. Test solenoid trip, initial pressure regulator, thrust bearing trip and auxiliary governor while unit is out of service for overspeed tests.
3. Turbine units less than 1000 hp and not equipped with exercisers for simulating should be tripped by actual

overspeeding test every 6 months to check the installed independent overspeed trip devices. For other turbines, test unit when going on line and when coming off line.

E. Annually

1. Inspect speed governor system and replace any worn parts. Clean and lubricate.
2. Annual inspection should include stop valve assembly, bearings, oil system, and access openings should be visually examined.

Internal Combustion Engines: (Excluding Automobiles)

A. Every 25 hours or 4 months

1. Adjust fan and alternator belt
2. Add oil to oil cup for distributor housing
3. Change oil in oil type air filter

B. Every 50 hours or 6 months

1. Drain and refill crankcase
2. Clean crank-case ventilation air cleaner
3. Clean dry-type air cleaner
4. Check transmission oil
5. Check battery

6. Clean external engine surface
 7. Perform 25-hour service (above)
- C. Every 100 hours or 8 months
1. Replace oil filter element
 2. Check crank-case ventilator valve
 3. Clean crank-case inlet air cleaner
 4. Clean fuel filter
 5. Replace dry-type air cleaner
- D. Every 200 hours or 12 months
1. Adjust distributor contact points
 2. Check spark plugs fouling and proper gap
 3. Check timing
 4. Check carburetor
 5. Perform 25, 50, and 100-hour service
- E. Every 500 hours or 24 months
1. Drain and refill transmission
 2. Replace crank-case ventilator valve
 3. Replace one piece type fuel filter
 4. Check valve-tappet clearance

5. Check crankcase vacuum
6. Check compression
7. Perform 25, 50, 100, and 200-hour service (above)

Reciprocating Compressor

General

1. Daily documented visual inspection of lubrication oil level, oil pressure, and oil flow. Also check inlet filters and water condensate level in storage tank.
2. Daily documented visual inspection of cooling water inlet and outlet temperatures, plus high water temperature warning device to shut-down compressor during prolonged high cooling water temperatures.
3. Weekly documented visual inspection of piston rod packing on the stuffing box for excessive leakage or piston rod damage from direct contact with stuffing box. Check operating compressor for unusual internal vibrations and excessive external vibrations of attached piping.
4. Periodic replacement of all inlet and discharge valves and internal inspection of piston rod nut and piston rings on all pistons. Valve replacement frequency will vary from monthly to yearly, depending on the purity of the processed gas.
5. Full capacity pressure relief valve between compressor discharge and first shut-off valve on the main compressed air pipeline.
6. Periodic cleaning of after cooler water tubes and air passages. Cleaning frequency will be a direct function of cooling water

purity and oil carry-over from the compressor.

7. Manufacturer's recommendations should be followed for completed tear down, cleaning, N.D.T. inspection and re-assembly.

Centrifugal Compressor

A. General

1. The internal or external lubrication system operating parameters should be monitored daily with all data documented to an operating log.
2. Inlet and outlet temperature of cooling media to compressor assembly should be monitored daily and documented to the operating log.
3. Lubrication oil in compressor gear case should be sampled and tested monthly for evidence of oil break down and early destruction of internal components.
4. Annually portable vibration monitoring should be done on the operating compressor and the data should be documented to a permanent equipment record.
5. Centrifugal compressor manufacturer's recommendations for tear down, cleaning, inspection and rebuilding of their compressor and all auxiliaries should be incorporated into the plant maintenance program.
6. Daily documented visual inspection of lubrication system and cooling system parameters during vacuum pump operations.
7. Daily documented verification of actual vacuum gauge readings and actual operating temperatures of vacuum

pump and discharged gases.

8. Special filtering equipment with adequate capacity, upstream of vacuum pump to prevent foreign objects or materials from entering the pump and causing subsequent internal damage.

Pumps

A. Positive Displacement

1. The internal or external pressure relief valve installed at the pump discharge should be cleaned, inspected, and tested on routine preventive maintenance program.
2. Clean or replace at programmed intervals, the strainer at pump inlet to prevent foreign material entrance into the rotating elements and the pressure relief valve.
3. Installation of check valve at pump discharge to prevent back flow from main piping header through pump, and into the suction lines.
4. Daily visitation for excessive noise levels produced by pump as a result of broken or worn internal parts.
5. Daily visual inspection for excessive vibration on piping system as a result of piping misalignment to the pump inlet and discharge connections.
6. The parameters of the pump heating fluids or cooling fluids should be monitored daily, and documented to the operating log book.
7. Lubrication of all pump bearings as recommended by pump manufacturer.

B. Centrifugal and Axial

1. Daily documented inspection of pump site to check for stuffing box leakage, excessive bearing temperatures, excessive pump noise and excessive piping vibration.
2. Check valve at pump discharge to prevent reverse flow through pump, and subsequent impeller detachment from shaft.
3. The adequate fluid flow to mechanical seals should be monitored daily to prevent early destruction of the seal.
4. Factory lubrication recommendations should be followed during the normal life of the pump.
5. A generally accepted cardinal rule for maintenance of a centrifugal pump is that as long as operation continues, normally the unit should be left alone.

Fans and Blowers

General

1. Quarterly documented inspection of lubrication oil flow, oil clarity, reservoir oil levels, or grease lubrication system.
2. Quarterly documented verification of inlet and outlet temperatures of coolant supplied to fan housing or liquid cooled driver motors.
3. Very high temperature (over 800 degrees Fahrenheit) process fans and blowers should be equipped with high temperature sensors and inlet shut-off or automatic bypass at fan inlet to prevent overheated process gas damage to the fan wheel.

4. Documented quarterly portable vibration inspection of fan or blower housing during normal operations.

Gear Sets

A. OPEN

1. Annually documentation of visual inspection of lubrication grease film on gear teeth.
2. Machine monitors on pinion gear bearings as a constant maintenance surveillance of all rotating parts in the gear set.
3. Yearly surface pyrometer or infrared inspection of pinion gear tooth flank to verify alignment of gear set.

B. ENCLOSED

1. Daily documented inspection of lubrication oil flow, oil clarity, and reservoir oil level.
2. Daily documentation of gear box temperatures, inlet and outlet temperatures of cooling medium used for external cooled heat exchanger.
3. Monthly lubrication oil samples taken from the gear boxes should be tested for oil breakdown, atmosphere contamination, metallic particles from internal components and moisture build-up from atmospheric condensate or liquid cooled internal heat exchanger.
4. Documented monthly portable vibration inspection on gear box input and output shafts for all machines critical to plant production.

5. Documented yearly visual internal inspection of all gear surfaced and gear box structural integrity on all machines critical to plant production.

Shaft Mounted Couplings

1. Documented monthly portable vibration monitor signatures of bearings at each side of the shaft mounted couplings.
2. Scheduled lubrication as recommended by manufacturers of all shaft mounted couplings.

Base Mounted Couplings and Clutches

1. Inlet and outlet temperature of cooling media on all coupling and clutches should be monitored daily with information documented to all operating log.
2. Lubrication oils and coupling fluids should be monitored daily for temperature and fill level with all information to an operating log.
3. Lubrication oil samples from all couplings and clutches should be tested every three months for evidence of oil breakdown, oil contamination, and early distribution of internal components.
4. All electric clutches and couplings should have collector rings cleaned and tested, as required by environmental conditions.
5. Manufacturer's recommended periodic tear down, cleaning, inspection, and rebuilding procedures should be incorporated into the existing plant maintenance program.

Fly Wheels and Pulleys

1. If overspeed devices are used on the drive system, they should be cleaned, inspected, recalibrated, and tested yearly.
2. During yearly scheduled shutdowns, a visual inspection of all painted surfaces will reveal any areas of over-stress that should be further inspected with N.D.T. equipment.

NON-DESTRUCTIVE EXAMINATION METHODS

ULTRASONIC

Used on metal, ceramics, plastic, etc. to detect surface and subsurface discontinuities, measure thickness of a material, and detect weld flaws.

Advantage: Only one side of a surface of an object need be accessible.

Principle: High frequency vibration or sound waves are reflected as echoes from both the discontinuity and the front and back surfaces of the piece being tested. Echoes are converted to electric signals for amplification and display on an oscilloscope.

RADIOGRAPHY

Used to search for imperfections beneath the surface of fabricated metal in fired and unfired pressure vessels. Also used to reveal internal discontinuities in welded joints. Will pick up gas pockets or voids, slag inclusions, incomplete fusion and inadequate joint penetration.

Advantage: Gives a permanent record and in most instances, will detect a small discontinuity.

Principle: Short wave-length electromagnetic radiation, specifically X-Ray or Gamma Ray, is used to penetrate objects opaque to longer wave length visible light.

LIQUID PENETRANT

Used to locate surface discontinuities in various products, such as fine surface cracks.

Advantage: Can provide indication of discontinuities in metals and other nonporous materials.

Principle: Liquid flows evenly over the object and into the tiny cavities of the specimen. Excess material is removed leaving behind that which seeped into the discontinuity. A developer draws the material that seeped into the discontinuity by capillary action. After drying, examination is performed under a white light or black light condition depending on whether visible dye or fluorescent penetrants were used.

MAGNETIC PARTICLE

Used to detect discontinuities such as surface or slightly subsurface cracks in ferromagnetic materials.

Advantage: The sensitivity of the magnetic particle test is higher than that of the dye penetrate process.

Principle: Either dry powder or liquid fluorescent magnetic particles are used. The method consists of magnetizing an area to be examined and then applying magnetic particles of different colors to the surface. The particles are retained on the surface at cracks and discontinuities due to leakage in the magnetic field.

EDDY CURRENT

Used to check pipe and tubing for defects such as seams as shallow as .002 of an inch in such material as automotive valve spring wire. It can check over 150 feet of resistance per minute.

Advantage: Can detect flaws in materials not easily accessible.

Principle: A circulating electrical current is induced in an object being checked. This electrical whirlpool is known as an eddy current. Flaws in the test material disrupt the current and consequently reveal themselves.

THERMAL OR INFRARED

Used to test the amount of heat or the heat flow through a piece of equipment and measure its quality for evaluation. Will pick up hot spots in electrical equipment such as switchboards, cables, etc.

Advantage: An entire plant can have its electrical equipment checked in a short period of time. Will point out hot spots and the degree of heat being admitted over normal temperatures. Equipment can take a picture of the material showing the seriousness of the condition.

Principle: Infrared, known as thermovision, is equipment which detects admitted infrared radiation, converts it to be video signal and reproduces the thermal image in black and white on a monitor screen. It allows you to see heat images.

OVERPOTENTIAL

Determines if insulation on electrical equipment can withstand the normal or abnormal stresses to which it is subjected.

Advantage: Equipment for D.C. overpotential testing is relatively small, lightweight, portable and less expensive than the equivalent A.C. equipment. D.C. voltages are less damaging to insulation than A.C. and time is not critical.

Principle: The D.C. overpotential test is a controlled over-voltage test, sometimes referred to as a direct current leakage test of step voltage test. The current is measured at each step increase of applied direct current-potential and is constantly observed for any abnormalities since, in most cases, the test can be stopped before breakdown occurs.

INSULATION-RESISTANCE

Used to detect grounds, damp windings, carbonized or damaged insulation,

foreign deposits, current leakage to ground and other conditions that cause or contribute to electrical breakdown.

Advantage: Test equipment is generally lightweight and portable. Testing can also be completed in a short time.

Principle: A 500 volt D.C. megger is standard test instrument. Electrical equipment should be disconnected from all sources of power. Insulation resistance varies with changes in temperature, humidity, test voltage, and duration of test voltage application. Consequently, for a comparison of one set of readings with another, the conditions should be the same. Ideally, the insulation-resistant test should be administered by applying 500 volts for D.C. for one minute at a temperature of 40 degrees FC.

DIELECTRIC ABSORPTION

This test furnishes data concerning the relative condition of the insulation with respect to moisture and other contaminants.

Advantage: Test equipment is generally lightweight and portable. Access to only one surface is needed.

Principle: Insulation-resistance test equipment can be used for this test. A test voltage of 500 volts direct current is commonly used and applied for 10 minutes, with readings of the insulation resistance taken at definite intervals. For high voltage apparatus, a 2,500 volt test voltage is preferred. A graph of the insulation resistance in megohms as a function of time should be plotted. Readings are taken at 1/4 minute intervals for the first minute and every minute for the next 9 minutes. A steady increase in insulation resistance during the time that the voltage is applied is an indication of clean dry windings. A moist or dirty winding will not have a steady increase and the curve will flatten out. This is the result of current leaking through, or over, the surface of the winding insulation.

POWER FACTOR

Sometimes known as the “doble” test, it is used for determining the quality of the insulation in cables, circuit breakers, insulating liquids, regulators, rotating machines and transformers. Also, insulating qualities of bushings and insulators, machines and transformers. Also, insulating qualities of bushings and insulators.

Advantage: Equipment is generally lightweight and portable.

Principle: Power factor is a measure of the energy component of the charging current and watts loss of insulation. The type of insulation, test voltage and the moisture and voids in the insulation, principally affects the power factor of the insulation. An increase in the power factor over a period of time indicates deterioration. Results are recorded and compared with previous tests. A low power factor is an indication of a safe condition.

DISSOLVED GAS ANALYSIS

GAS CHROMATOGRAPHY (GC)

The most informative method of fault gas detection is dissolved gas analysis. In this laboratory method, an oil sample is taken from a transformer; the dissolved gases are then extracted, separated, identified, and quantitatively determined.

Various lab methods have been used, including infrared absorption and mass spectroscopy, but gas chromatography has emerged as the most popular technique. Electrical arcing or corona action under oil creates acetylene and other combustible gases; therefore, the presence of combustible gases dissolved in the oil is indicative of incipient faults. These incipient faults can often be found in advance of failure. Our experience with this testing method has been excellent. Many costly failures, both from the standpoint of rewind costs and unit downtime, have been avoided, based on GC test results.

Diffusion of gases between liquid and gaseous spaces takes time, during which serious equipment damage can occur undetected, if only gas samples from the transformer head-space are analyzed for combustibles.

Monitoring the oil for dissolved gases offers both the required sensitivity, and gives the earliest possible detection of a newly-formed fault. The only disadvantage for GC lies in that it can't be done readily (as yet) in the field. On the other hand, this method is not only applicable to all types of oil-filled equipment, it gives the information required to properly evaluate the transformer's ability to properly perform its intended function.

LOUISIANA PREVENTIVE MAINTENANCE PROGRAM

(Revised January 2000)

Funds were appropriated from the Legislature for the continuation of the State's Boiler and Machinery Preventative Maintenance Program. To apply for funds you will be required to follow these procedures.

Procedures to be followed for obtaining monies for internal inspection repairs, replacement and/or overhaul of boiler/machinery and air conditioning equipment owned by the State:

1. In order to be eligible for funds, you must have written a Loss Prevention Maintenance Program for all of your boiler and machinery equipment which will indicate the history of each piece of equipment and will include as a minimum responsibilities, when maintenance is to be performed and how records will be maintained. This program must be audited and approved by the Office of Risk Management.
2. A written request shall be submitted to the Office of Risk Management, Loss Prevention Unit, stating the amount needed on each piece of equipment. Each request shall refer to Project 01-10-0085-1 equipment by location, manufacturer's name, model and serial number. The Loss Prevention Unit will assign a separate file number for each piece of equipment to be repaired or replaced. An original invoice submitted to the Loss Prevention Unit for payment must reflect the above information.
3. A statement from the Agency Head must also be reflecting that no funds are available within the agency budget to perform the necessary repairs.
4. An inspection of the equipment must be made by engineers of the Boiler and Machinery Insurer for the State or the Loss Prevention Officer of the Office of Risk Management.

NOTE: A letter from either the Commercial Carrier or a Loss Prevention Officer of the Office of Risk Management verifying the need for inspection, repair, reconditioning, overhaul, or replacement of equipment is required.

5. A copy of bids or telephone quotes and the purchase order or requisition used to secure services, based on the lowest overall cost must be transmitted to the Office Risk Management, Loss Prevention Unit, Division of Administration, P.O. Box 94095, Baton Rouge, LA 70804-9095.
6. Contract price from factory representative or low bidder to perform operation necessary to effect an inspection must not exceed \$1,500.00.
7. Before proceeding, you must have written approval from the Office of Risk Management.
8. After receiving approval, a signed copy of the contract and/or purchase order must be forwarded to the Office of Risk Management.
9. Upon completion of work to be performed by the vendor, submit original approved invoice along with pink purchase order and/or contract for payment. Additionally, submit goldenrod or yellow copy of receiving report along with items quantity and date merchandise received and indicate complete or final payments to the Office of Risk Management.
10. After an inspection by the Office of Risk Management, Loss Prevention Unit to verify satisfactory completion, invoices will be submitted to Facility Planning and Control for payment.
11. After reviewing invoices and necessary documents for compliance with the Procurement Law, Facility Planning will then make payment to the vendor unless otherwise instructed by the Office of Risk Management.
12. Facility Planning will submit a photostatic copy of the check to the Office of Risk Management at the following address:

*THE LOSS PREVENTION UNIT
P.O. BOX 94095 - CAPITOL STATION
BATON ROUGE, LA 70804-9095*

ROOF INSPECTION PROGRAM

The Roof Inspection Program is part of the Preventative Maintenance Program. The Roofing Section of the Office of Facility Planning and Control in the Division of Administration is responsible for administering this program for the State.

Questions concerning compliance with this program are addressed on the annual ORM Loss Prevention Audit in the Equipment Management Section of the audit form.

Questions about this program, related training and/or funding should be addressed to:

THE ROOFING SECTION
OFFICE OF FACILITY PLANNING AND CONTROL
DIVISION OF ADMINISTRATION
STATE CAPITOL ANNEX
P.O. BOX 94095
BATON ROUGE, LA 70804-9095

225-342-7663